COMBINED SCIATIC FEMORAL BLOCK BY ANTERIOR APPROACH FOR BELOW KNEE SURGERY

A STUDY OF 40 CASES

DISSERTATION SUBMITTED FOR

DOCTOR OF MEDICINE
BRANCH X
(ANAESTHESIOLOGY)

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CERTIFICATE

This is to certify that this dissertation entitled "EVALUATION OF COMBINED SCIATIC FEMORAL NERVE BLOCK THROUGH ANTERIOR TECHNIQUE VIA SINGLE POINT OF ENTRY FOR BELOW KNEE SURGERY" submitted by DR.R.GUNASEELAN to the faculty of ANAESTHESIOLOGY, The TamilNadu Dr. M.G.R. Medical University, Chennai, in partial fulfilment of the requirement in the award of degree of M.D.Degree, Branch -X (ANAESTHESIOLOGY), for the March 2009 examination is a bonafide research work carried out by him under our direct supervision and guidance.

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DECLARATION

I, **Dr. R.GUNASEELAN** declare that the dissertation titled **"EVALUATION OF COMBINED SCIATIC FEMORAL NERVE BLOCK THROUGH ANTERIOR TECHNIQUE VIA SINGLE POINT OF ENTRY FOR BELOW KNEE SURGERY"** has been prepared by me.

This is submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai, in partial fulfilment of the requirement for the award of M.D. Degree, Branch X (ANAESTHESIOLOGY) degree Examination to be held in March 2009.

Place : Madurai

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TABLE OF COTENTS

INTRODUCTION

The technique of peripheral neural blockade was developed early in the history of anaesthesia. These techniques have evolved because of strong enthusiasm, and as the sole technique for surgeries and also as supplementary analgesia and for post operative pain management.

Anaesthesiologists are very skilled in performing variety of nerve blocks. Today because of advances in science and technology these techniques are made with more accuracy and reliability.

These techniques also evolved as other modes of anaesthesia can't be given. These techniques avoid the complications of general anaesthesia and also where general anaesthesia is not advisable.

The peripheral nerve blockade provides better haemodynamic conditions and also provides good post-operative pain relief. Few surgical procedures below the knee can be done with sciatic nerve block alone. But when the sciatic nerve block is combined with femoral nerve block the entire lower extremity can be blocked providing surgical anesthesia and good post operative pain relief. Both nerve blocks are usually required because most surgeons use tourniquet which can cause significant discomfort and pain. Several techniques are known to block

sciatic nerve. But in my study anterior approach was used in which the block was done in supine position without moving the patient by using peripheral nerve stimulator.

PERIPHERAL NERVE STIMULATORS:

Until recently, elicitation of parasthesia has been a classical method to locate nerves for peripheral nerve blocks.Peripheral nerve stimulator technology utilizes objective end points for nerve localization and does not depend on patient's cooperation for effective nerve localization. An effective use of PNS technology mandates the knowledge of anatomy with respect to

- Optimal needle insertion site to achieve needle tip-target nerve contact
- Muscle innervations scheme of the targeted nerve to identify desired evoked motor response (EMR)
- Ability to differentiate desired EMR from the alternate EMR"s elicited by the stimulation of adjacent muscles and collateral nerves
- And, the relationships of the adjacent neuromuscular structures generating these alternate EMR"s to the targeted nerve.

Therefore an algorithm can be designed for needle redirection during PNS assisted PNB.

This study attempts to evaluate the technique of combined sciatic and femoral nerve block through anterior approach by using the peripheral nerve stimulator.

AIM OF THE STUDY

To evaluate the technique and success of combined sciatic and femoral nerve block through anterior approach via single point of entry for below knee surgeries by using peripheral nerve stimulator.

HISTORY

1. **"The doctrine of specific energies of the senses"** – proclaimed by **Johannes P.Mueller** in 1826 stated that "it is the nerve that determine what the mind previous which opened up a new field of scientific thought and research into nerve function".

2. Theory by **Moritz.S. Schiff** in 1858 claimed pain as a separate and distinct sense.

3. In 1845 on 3rd June **Sir France Rynd** appointed surgeon to meath hospital delivered morphine solution to a nerve for relieving intractable neuralgia – solution delivered by means of gravity through cannula.

4. First use of syringe and hypodermic needle in 1855 by **Alexander wood**.
5. **Carl Koller**, an intern at ophthalmologic clinic at university of Vienna gave topical anaesthesia with cocaine on September 11, 1884 for glaucoma correction.

6. 1884 **William Steward Halsted** performed first documented Brachial plexus anaesthetic under direct vision of John Hopkins.

7. In 1911 **Hirschel** and **Kulenkompff** performed first percutaneous Axillary and supraclavicular Brachial plexus blocks.
8. **Victor pauchet** in 1914 published the textbook for Regional anaesthesia – **'L' Anesthesie regionale"** the first book of its kind.
9. **Gaston Labat** in 1922 published the first edition of **"Regional anaesthesia – technique and clinical applications"**.
10. In **1923** an American society of regional anaesthesia was found.
11. Continuous peripheral nerve block with catheters was first performed in 1946. Anghoro did the first continuous brachial plexus block in 1946.
12. In 1973 **Montgomery Raj** first used nerve stimulator in clinical practice.
13. **Rosenblatt** was the first to use catheters to provide continuous femoral block for lower limb surgeries.

ANATOMY OF LUMBAR PLEXUS

Lumbar plexus lies deep in the psoas major muscle in front of the transverse process of lumbar vertebrae.

It is formed by - ventral rami of first four lumbar nerve

- greater part of ventral rami of fourth lumbar nerve

All the branches of plexus emerge from the substance of psoas major muscle.

L_1 –frequently supplemented by T_{12} divides into upper and lower branches.

Upper branch gives illioinguinal and illiohypogastric nerves.

Lower branch unites with L_2 to form genitofemoral nerve.

L_2, L_3, L_4 - divides into ventral and dorsal division.

-Ventral division as obturator nerve

-Dorsal division as femoral nerve and

-Lateral cutaneous nerve of thigh

Relations of Lumbar plexus and its branches:

Lumbar plexus forms within (or) passes through the space between quadratus lumboram and psoas major muscle. At this point the nerve lies within the compartment formed by the fascia of these muscles.

Branches:

Lateral cutaneous nerve of thigh -leaves medial border of psoas major at its midpoint to enter lateral thigh at a very superficial level.

Obturator nerve – leaves medial border of psoas major and enter medial thigh at a very deep level.

Femoral nerve the largest branch of plexus appears at the lateral margin of psoas major muscle and remains in the groove between psoas major and iliacus muscle. At the base of femoral triangle the nerve lies one finger breadth lateral to the femoral artery. In the femoral triangle the nerve divides into anterior and posterior division.

Anterior division gives muscular branches to

1) Pectinius
2) Sartorius

cutaneous branches

3) Intermediate cutaneous nerve of thigh

4) Medial cutaneous nerve of thigh

Posterior division:

Muscular branches to quadriceps femoris

Cutaneous branch – saphenous nerve

The saphenous nerve is the largest cutaneous branch of the femoral nerve and the only cutaneous branch to originate from the posterior division. This nerve gives sensory innervation to the medial aspect of the knee, leg, ankle and foot.

Femoral Nerve Block:

It is relatively easy to block the femoral nerve just inferior to the inguinal ligament. A needle passed just lateral 1-2 cm to femoral artery with cephalad angulation. If a nerve stimulator is used contractions of the quadriceps femoris will cause the patella to dance which is considered as the evoked motor response of femoral nerve.

Since the saphenous nerve originates from the posterior division of the femoral nerve, the end point of locating the nerve is confirmed when

patellar dance is considered as the evoked motor response, since both the branches originate from the posterior division. 15ml of the local anaesthetic mixture is infiltrated to block the femoral nerve.

Sacral Plexus:

It is formed by anterior primary rami of L_4, L_5, S_1, S_2, and S3. The L_4, L_5 fuse to form lumbosacral at the medial border of psoas muscle and passes over the pelvic brim and join S_1 at the sacroiliac joint. The anterior primary rami of S_1-S_4 emerge through anterior sacral foramina; S_5 appears between the inferior lateral angle of the sacrum and the transverse process of the coccyx and escapes below the transverse process, piercing the coccygeal muscle.

The branches of sacral plexus:

a) Collateral	1) Muscular
	2) Cutaneous
	3) Visceral
b) Terminal	1) Sciatic
	2) Pudendal

Sciatic Nerve ($L_{4,5}$ S_{1-3})

It is the largest peripheral nerve in the body. It is flattened at its origin. It is made up of two nerve components, tibial and peroneal, within one common sheath of fibrous tissue. This nerve usually splits into two components at the apex of the popliteal fossa, but the division may occur proximally also. Occasionally the two components are separate from its origin itself. But it is rare.

Relation:

Sciatic nerve leaves the posterior pelvic wall through greater sciatic foramen below pyriformis and descends midway between the ischial tuberosity and greater trochanter. The sciatic nerve then descends vertically down the midline as far as to the apex of popliteal fossa.

Surface marking:

The sciatic nerve can be marked by a line which connects the posterior superior iliac spine and tip of the ischial tuberosity, curves, outwards and downwards just medial to the mid point joining greater trochanter and ischial tuberosity and then continues vertically downwards in the posterior aspect of thigh.

Sciatic nerve block

It can be blocked by

1) Labat – the posterior approach
2) Anterior approach
3) Lateral approach
4) Raj approach

Anterior Approach of Sciatic Nerve Block:

Land Marks:

The anterior approach to the sciatic nerve was delovoped to over-come the problem of patient positioning. The land marks are the inguinal ligament and the greater trochanter of femur. First a line joining the anterior superior iliac spine and pubic tubercle is drawn. This represents the inguinal ligament. Another line joining the greater trochanter is drawn parallel to the first line. From the first line at the junction of lateral $2/3^{rd}$ and medial $1/3^{rd}$ a perpendicular line joins which intersects at the 2^{nd} line. Through the intersecting point anterior approach of sciatic nerve performed.

With the help of the nerve stimulator the end point for locating the nerve is dorsi (or) plantar flexion of the foot which is considered as the evoked motor response with 0.4ma as the lower limit of current used.

The other methods of sciatic block can be done by eliciting parasthesia.

By performing both sciatic and femoral block the sensory distribution completely below the knee is completely blocked and any type of surgery can be done below the knee.

Peripheral nerve stimulator

The use of peripheral nerve stimulators in regional anaesthesia is not new. As early as 1912, Von Perthes described the use of peripheral nerve stimulators. With the resurgence of interest in regional anaesthesia and demand for more accurate nerve localization before injection of Local anaesthetics it comes as a no surprise that often Nerve stimulators be used. In 1850 von Helmohlz had Showed an isolated nerve muscle Preparation, and the Temporal nature of nerve fiber conduction and elucidation of the relevant physiology of peripheral nerve stimulation. Of particular importance is the relationship between the Strength and the duration of the current and the polarity of the stimulus. In order to

propagate a nerve impulse, a Certain threshold stimulus must be applied to the nerve.

Of note, below this threshold, no impulse is propagated, and increase in the intensity of the stimulus above this threshold propagation or triggered impulse is further increased. Assuming a square pulse of the current is used to stimulate the nerve, the total energy applied to the nerve is a product of the intensity of the current and the duration of the of the pulse. There are two terms important to understanding the nerve stimulation: the reobase and chronaxie. The reobase is the minimal current required to the nerve with a long pulse. The Chronaxie is the duration of the stimulus required to Stimulate at twice the reobase.The chronaxie can be used as a measure of the threshold for any particular nerve and it is useful when comparing different nerves or nerve fibre types.

A nerve stimulator supplies electrons to depolarise a nerve. The number of electrons supplied per stimulus equals the current.

Placement of electrodes

An important principle of peripheral nerve stimulation is the preferential cathode stimulation. For instance, when the nerve is stimulated by an electrode, significantly less current is needed to obtained

a response to nerve stimulation when the cathode (negative) is adjacent to the nerve, rather than the anode (positive is adjacent to the nerve). The reason for this phenomenon is because when the stimulating electrode is negative, the current flow alters the resting membrane potential adjacent to the needle, producing an area of depolarization which then spreads across the nerve. When the electrode adjacent to the nerve is an anode, the current causes an hyperpolarization adjacent to the needle and a ring of depolarization distal to the needle tip. This arrangement is less efficient in propagating the stimulus and has clinical Implications.

Types of Nerve Stimulator:

The connection between the electrodes and the skin is not constant. If the electrodes dry out or come a bit loose from the skin their resistance will increase. There are two ways a nerve stimulator can respond to this change...with a constant voltage or a constant current.

Voltage = Current X Resistance

Constant Voltage Nerve Stimulators

Constant voltage nerve stimulators are relatively easy and cheap to make. Unfortunately if the voltage remains constant when resistance increases then the current must decrease. As a result the nerve may not be

completely stimulated. The muscle contraction will then be depressed. The anaesthetist will falsely think that the neuromuscular blocking drug is still working. This can be dangerous if the patient moves during a delicate phase of surgery.

Some constant voltage nerve stimulators will display the current actually delivered and will alarm if it falls below some predefined threshold.

Constant Current Nerve Stimulators

Constant current nerve stimulators are the safest but also the most expensive to build. As the resistance of the electrodes goes up they compensate by increasing their voltage. As a result the current stays constant. The stimulation of the nerve remains constant. Any change in response is occurring at the neuromuscular junction or in the muscle itself.

There is a limit to how high the nerve stimulator can raise the Voltage. At this point the stimulator should give an audible and Visual alarm that the stimulating current has not been reached.

The nerve stimulator offers feature enhancements such as:

Selectable stimulus pulse duration: 0.1ms, 0.3ms, or 1.0ms. Switchable linear current range – from 0-1 mA or from 0-5 mA - enabling increased accuracy when stimulating at low current levels .Two different display modes: desired current setting, or actual current delivery to patient.

Ability to vary the pulse duration allows the localization of practically all mixed nerves for plexus and peripheral nerve blocks.

0.1ms = Motor Nerve Response Short, rectangular pulse width duration of 0.1ms targets A alpha large nerve fibres to generate pain free motor responses in the patient.

0.3ms = Motor + Sensory Nerve Response Selecting a pulse duration of 0.3ms may enable selective stimulation of motor fibres with minimal unpleasant sensations for the patient. Blockade performance time may also be shortened by use of longer pulse duration of 0.3ms

1.0ms = Sensory Nerve Response In addition, pure sensory nerves can be located using a longer pulse duration of 1.0 ms to stimulate sensory fibres.

The special insulation coating of the D Series needles exposes only the pin point tip of the needle. This concentrates the entire stimulus current at the extreme needle tip.

Enables to precise nerve localization at the lowest threshold currents.

The D Series needles will be available in a variety of procedural lengths to suit practically all indications in plexus anaesthesia. You also have your choice of 15° or 30° bevels according to your personal preference of puncture force and gliding characteristics

Characteristics of an ideal PNS:

1. Constant current output-A particular current not the voltage stimulates the nerve. Therefore, the current delivered by the device should not vary with changes in the resistance of the external circuits.
2. Digital display of the delivered current
3. Variable output control
4. Clearly identifiable polarity
5. Option for different pulses
6. A wide range of current output 0.1-5.0mA
7. Battery indicator

Peripheral nerve stimulator settings:

MIXED NERVE (most PNB)

Current (dial) -> 1mA

Current duration-0.1ms

Frequency-> 1-2Hz

SENSORY NERVE (eg-Lateral femoral cutaneous and saphenous nerves)

Current (dial)->2-5mA

Current duration-1ms

Frequency-1Hz

DIABETIC NEUROPATHY (PNB)

Current (dial)->2mA

Current duration->0.3ms

Frequency->1-2HZ

PHARMACOLOGICAL CONSIDERATION

a) Bupivacaine:

Bupivacaine is an amide linked local anaesthetic. It is a hydrochloride salt of d (1)-1-butyl 2'6' pipecoloxylidide and is presented as a racemic mixture.

- It was synthesized by EO af Ekenstem.
- First reports of its use were published in 1963 by Telivuo.
- It is derived from Mepivacaine and is very stable compound and may be autoclaved repeatedly.

Pka is 8.1

MW - 288

Protein binding - 95%

Lipid solubility - 28

Elimination half life - 210mts

Toxic plasma concentration - >1.5μg/ml

Approximate duration of action - 175mts

Availability:

Ampoule - 0.5% Bupivacaine hydrochloride 4cc

- 0.5% Bupivacaine hydrochloride with dextrose (heavy) 4cc

Vials - 0.25% and 0.5% Bupivacaine hydrochloride 20cc

Dosage - Maximum dosage 3mg/kg body weight.

Uses:

- Spinal anaesthesia
- Epidural anaesthesia
- Caudal anaesthesia
- Continuous epidural anaesthesia
- Peripheral nerve block

Pharmacokinetics:

It is rapidly absorbed from the site of injection, but the rate of absorption depends on the vascularity at the site and presence of vasoconstrictors.

High lipid solubility of bupivacaine makes it easy for nerve and vascular tissue penetration.

80-95% of the absorbed bupivacaine binds to the plasma.

Biotransformation:

Possible pathways of metabolism of bupivacaine include aromatic hydroxylation and conjugation. Only the N-dealkylated metabolite, N-

desbutyl bupivacaine has been measured in blood (or) urine after epidural (or) spinal anaesthesia. Alpha1 acid glycoprotein is the most important plasma protein binding site of bupivacaine and its concentration is increased by many clinical situations including post operative trauma.

Excretion:

It is through the kidney; 4-10% of the drug is excreted unchanged.

Mode of Action:

a) Sodium Channel blockade:

They impede sodium ion access to the axon interior by occluding the transmembrane sodium channels thus delaying the process of depolarization and axon remains polarized. It is a non-depolarization blockade.

Pharmacodynamics:

It has got a longer duration of action but a slower onset.

Toxicity:

Toxicity is related to plasma level of unbound drug and more likely due to an inadvertent intravenous injection. Systemic toxicity reactions

primarily involve central nervous system and cardio vascular system. The blood level required to produce central nervous system toxicity is less than that required to produce circulatory collapse.

Central Nervous System Toxicity:

Initial symptom includes feeling of light headedness and dizziness, followed by visual and auditory disturbances. Objective signs are excitatory and include shivering, muscle twitching and tremor. Ultimately generalized tonic, clonic seizures occurs.

Cardiovascular System Toxicity:

The rate of depolarization in fast conducting tissue of purkinje fibres and ventricular muscle is decreased. The rate of recovery of bupivacaine induced block is slower than that of lignocaine. Extremely high concentration of the drug causes sinus bradycardia and cardiac arrest.

PHARMACOLOGY OF LIGNOCAINE

Lignocaine is a synthetic amide-linked anaesthetic of intermediate potency and duration. In 1943 Lofgren synthesized Lignocaine in Sweden. First used by Gordh in 1948.

Lignocaine is the standard to which all other local anaesthetics are compared. It is currently the most widely used local anaesthetic. In addition, it is a popular antiarrythmic. It can be given by almost any route.

Mechanism of action:

Lignocaine prevent transmission of nerve impulses by inhibiting passage of sodium ions through ion-selective sodium channels in the nerve membranes. This slows the rate of depolarization such that the threshold potential is not reached and thus action potential is not propagated. But resting membrane potential is not altered. Lignocaine binds to the inner portion receptor (i.e. Sodium channel) after entering the cell membrane.

Physiochemical properties:

Molecular weight 234

Weak base with a pka 7.6 – 7.8

Very stable, not decomposed by boiling, acids or alkalis

It is less lipid soluble than that of Bupivacaine

Pharmacokinetics:

Absorption:

It is absorbed from the site of application or injection into the blood stream. Rate of absorption depends on the blood flow to the area and use of epinephrine.

Metabolism:

Metabolised in liver by oxidative dealkylation to monoethylglycine xylidide followed by hydrolysis of this metabolite to xylidide. Metabolism is dependant on hepatic blood flow.

Monoethylglycine xylidide has 80% activity of the parent drug.

Xylidide has 10% activity of the parent drug.

75% of xylidide is excreted in the urine as 4 – hydroxyl – 2, 6 – dimethylaniline.

Onset of action:

Rapid onset of action

- Topical anaesthesia 5-10 mins
- Conduction anaesthesia

  For small nerves 5-10 mins

  For large nerves 10-15 mins

- Intravenous administration 1-2 mins

Protein binding:

It is 70% bound to α 1 acid glycoprotein

Volume of distribution:

91 litres

Distribution:

Lignocaine has a triphasic distribution

Rapid distribution phase (α):

In this phase, the drug is distributed to highly vascular regions.

$t^{½}$ α is 1 min.

Slow disappearance phase (β):

The drug is distributed to slowly equilibrating tissues.

$t^{½}$ β is 9.6 min.

Slow transformation and excretion phase (δ):

$t^{½}$ is δ is 1.6 hrs

Clearance is 0.95 litres per minute

Availability:

a) 5% heavy 2 ml ampoules which contain 50 mg of lignocaine / ml with 75 mg – 100 mg of dextrose
b) 2% ligcocaine (xylocard) without preservative – 50 ml vial for intravenous use
c) 2% lignocaine – plain – 30 ml vial –contains methyl and propyl paraben as preservative
d) 4% lignocaine with 1 in 200000 Adrenaline – 30 ml vial.
e) 4% lignocaine viscus
f) 4% lignocaine aqueous solution
g) 10% lignocaine spray
h) 2% lignocaine Jelly
i) 2% lignocaine ointment
j) 5% lignocaine ointment

Pharmacodynamics:

Local actions:

Causes nerve blockade with loss of pain and temperature sensation, touch, motor power and vasomotor tone in the region supplied by the nerves blocked.

Systemic actions:

Result of systemic absorption from the site of administration or intravenous administration

Cardiovascular system:

It has a stabilizing effect on the cell membranes of cardiac tissue.

Lignocaine depresses myocardial automaticity by antagonizing the spontaneous phase IV depolarization and reduces the duration of effective refractory period.

Myocardial contractility and conduction velocity are depressed at higher concentrations.

These effects result from direct cardiac muscle membrane changes (i.e.) cardiac sodium channel blockade.

It stabilizes the membrane of damaged and excitable cells, tending to suppress ectopic foci.

Respiratory system:

Lignocaine depresses hypoxic drive (the ventilatory response to low P_aO_2).

Apnea can result from phrenic and intercostal nerve paralysis or depression of the medullary respiratory center following direct exposure to the local anaesthetic agents.

Relaxes bronchial smooth muscle.

Intravenous lignocaine may be effective in blocking the reflex bronchoconstriction associated with intubation.

Vascular smooth muscle:

Produces vasodilatation

Central nervous system:

Produces a sequence of stimulation followed by depression. Produces sedation on intravenous administration.

Intravenous administration decreases cerebral blood flow and attenuates the rise in intracranial pressure that accompanies intubation.

Infusion of lignocaine is capable of reducing the MAC of volatile anaesthetics by 40%.

Musculoskeletal:

Lignocaine is myotoxic leading to lytic degeneration, edema and necrosis.

Haematological:

It decreases coagulation and enhances fibrinolysis

Indications:

1. For infiltration block, peripheral nerve blocks, epidural, spinal and topical anaesthesia & intravenous regional anaesthesia.
2. Antiarrythmic :

Lignocaine is a class IB antiarrythmic.

Ventricular tachyarrhythmias

Arrhythmias following acute MI during cardiac surgery

In digitalis toxicity – because it does not worsen AV – block

3. Prevention or treatment of increases in intracranial pressure during intubation
   - antitussive effect may be the reason.
4. Reflex induced bronchospasm is also attenuated by iv administration of lignocaine
5. Suppresses noxious reflexes such as coughing & sympathetic stimulations associated with endotracheal suctioning and intubation.
6. Used as an antiepileptic agent intravenously
7. Used intravenously as an analgesic for certain chronic pain states
8. Used as a supplement to general anaesthesia.

Contraindications:

Hypersensitivity

Should not be used with vasoconstrictor in digits of hand, feet and penis

Stokes Adams syndrome, severe degree of heart block

Doses:

Maximum recommended dose:

a) Plain - 3 mg / kg

b) with adrenaline- 7 mg / kg

c) for reflex suppression - 1.5 mg / kg iv.

Drug interactions:

β Blockers:

Co administration of beta blockers, increases serum levels of lignocaine and its toxicity by decreasing lignocaine's metabolism.

Anticonvulsant agents:

Increases lignocaine's metabolism

Non depolarizing muscle relaxant:

Blockade is potentiated by lignocaine

Opioids and α_2 adrenergic agonists :

Potentiate lignocaine's pain relief

Antiarrythmic agents

Potentiate the cardiac effects of lignocaine

Toxicity:

Mostly due to systemic absorption of locally administered lignocaine or due to accidental intravenous administration of large doses of lignocaine.

The central nervous system is mostly vulnerable.

Blood levels and symptoms :

4 µg / ml : Light headedness, tinnitus, circumoral and tongue numbness (anticonvulsant and antiarrhythmic activity)

6 µg / ml : visual disturbances

8 µg / ml : muscular twitching

10 µg / ml : convulsions

12 µg / ml : Unconsciousness

15 µg / ml : Coma

20 µg / ml : respiratory arrest

26 µg / ml : cardiovascular collapse

Treatment of toxicity :

Continuous monitoring of CVS and RS status helps to identify the toxicity earlier.

- ❖ If convulsions occur barbiturates or benzodiazepines can be given.
- ❖ Succinylcholine 1 mg / kg to paralyse the patient and aids in controlling the seizures.
- ❖ Cardiac toxicity like fibrillation can be treated by defibrillation
- ❖ Ventilatory support – 100 % oxygenation, intubation etc.,
- ❖ Maintain B.P. by rapid infusion of I.V. fluids, use of vasopressors and put the patient in Trendelenberg's position.
- ❖ Maintain fluid and electrolyte balance.

Adverse effects :

1. Allergic and hypersensitivity reactions

   Due to the preservative used – methylparaben

2. CVS :

   Bradycardia, hypotension

REVIEW OF LITERATURE

1. Pierre Pandin and Nathalie Vancutsem et al conducted a random study in which 119 ASA I and II patients scheduled for surgery below the knee were taken. Needle was advanced similar to the anterior approach of sciatic nerve. Thirty and 15 mL of 0.5% ropivacaine were injected close to the femoral and the SCN, respectively. Landmarks were determined within 1.7 min. The entire procedure was performed within 4.2 min. from the determination of the landmark to the SCN infiltration. The three-in-one technique was successful in 89.9% while SCN was successful in 94.9%. Femoral and tibial nerves were always blocked. Blockade of the posterior cutaneous femoral nerve was observed in 78% of patients. The extent and the quality of the sensory block always allowed surgery. Additional *IV* sedation was needed in 32.6% of patients. Motor block (adapted Bromage's scale > 2) was observed in the femoral (98.3%), the obturator (84.8%), the tibial (97.4%) and the common peroneal (85.7%) nerve distributions.

2. **Steur, R.J.and Blajenovde Lange et al** studied the injection point for the combined Sciatic-Femoral nerve block is as for the sciatic block described by Berdt in the anterior approach in 22 children. This needle entry point is marked on the pre-operative visit; an EMLA-patchˆ

is applied on the ward 1 hour before the block. With a current of 0.8 mAmp at 2 Hz motor contractions of the Quadriceps muscle femoral nerve is blocked then the needle pulled back to the subcutis and redirect to the Sciatic nerve. The needle is advanced perpendicular to the skin, medial of the Femur until twitches in the foot will been seen, indicating a stimulation of the Sciatic nerve. Above a threshold of 0.2 mAmp.By the one injection technique for both the femoral and sciatic nerve block, as described, both nerves were reached in 22 patients from anterior and this approach is well accepted by the children and their parents.

3. **Chelly JE**, **Delaunay L**.Department of Anesthesiology, The University of Texas conducted a comparative study in which Sciatic nerve blocks were performed in 22 patients with varying concentration of mepivacaine. Appropriate landmarks were determined within 1.3 min (0.5-2.0 min). The sciatic nerve was identified in all patients within 2.5 min (1.2-5 min), starting from the beginning of the appropriate landmark determination to the stimulation of its common peroneal nerve component in 13 cases and its tibial nerve component in 9 cases. A complete sensory block in the distribution of both the common peroneal nerve component and the tibial nerve component was obtained within 15 min (5-30 min). A shorter onset was observed in patients who received

mepivacaine alone compared with those who received a mixture of mepivacaine plus ropivacaine (10 min [5-25 min] vs. 20 min [10-30 min]; $P < 0.05$). Recovery time was 4.6 h (2.5-5.5 h) after mepivacaine administration. The addition of ropivacaine produced a block of a much longer duration 13.8 h (5.2-23.6 h); $P < 0.05$. No complications were observed

4. **Alain C. Van Elstraete and Claude Poey et al,** conducted a study assessed the reliability of the inguinal crease and femoral artery as anatomic landmarks for the anterior approach to the sciatic nerve and determined the optimal position of the leg during this approach. The sciatic nerve was located twice in 20 patients undergoing ankle or foot surgery, once with the leg in the neutral position and once with the leg in the externally rotated position. The patient was lying supine. A 22-gauge, 150-mm insulated b-beveled needle connected to a nerve stimulator was inserted 2.5 cm distal to the inguinal crease and 2.5 cm medial to the femoral artery and was directed posteriorly and laterally with a 10°–15° angle relative to the vertical plane. The sciatic nerve was located in all patients at a depth of 10.6 ± 1.8 cm when the leg was in the neutral position and 10.4 ± 1.5 cm when the leg was in the externally rotated position . In the neutral position and in the externally rotated position, the time needed to identify anatomic landmarks was 28 ± 15 s and 26 ± 14 s,

respectively and the time needed to locate the sciatic nerve was 79 ± 53 s and 46 ± 25 s ($P < 0.006$), respectively. We conclude that the inguinal crease and femoral artery are reliable and effective anatomic landmarks for the anterior approach to the sciatic nerve and that the optimal position of the leg is the externally rotated position. This new anterior approach to the sciatic nerve using the inguinal crease and femoral artery as landmarks is an easy and reliable technique.

5.Jerry D. Vloka and Admir conducted a study in 22 patients to know the effects of leg rotation to locate the sciatic nerve in the anterior approach to the sciatic nerve block, the femur often obstructs the passage of the needle toward the sciatic nerve. Needles were used to stimulate the anterior approach to the sciatic nerve block. The effect of leg rotation on the needle plane required to reach the sciatic nerve was studied with legs in the neutral position and then with internal and external rotation (45°) of the legs. During needle placement in the neutral position, the needle could not be fully advanced to the level of the sciatic nerve because of obstruction by the lesser trichinae in 80% of attempts. Medial redirection of the needle (10°–15°) allowed it to pass the lesser trichinae but brought the tip of the needle too medial to the sciatic nerve. Internal rotation of the leg facilitated passage of all needles inserted at the level of the lesser trochanter.This study conclude that internal rotation of the leg may

significantly facilitate needle insertion in the anterior approach to sciatic block.

6. **Fuzier R**, **Albert N** et al. conducted a comparative study between anterior approach and lateral approach with the patient in the supine position. In emergency setting. 59 patients undergoing post-traumatic lower extremity surgery under a sciatic nerve block were randomly assigned to a lateral or an anterior approach. After appropriate positioning ,with150-mm insulated needle using a nerve stimulator sciatic nerve was located, 25 ml of ropivacaine 0.75% were injected. Time to perform the block, sciatic nerve depth, success rate, and patient's comfort were analyzed. The mean time to perform the block was 4.9+/-4.0 min in the anterior group and 6.1+/-6.9 min in the lateral group (NS). The mean depth of sciatic nerve localization was 107+/-17 mm in the anterior group and 91+/-20 mm in the lateral group ($P<0.05$). Although the success was similar in both group (77% in the anterior group vs. 79% in the lateral group), the number of technical failure (sciatic nerve stimulation impossible) was higher with the anterior approach (86% vs. 33%; $p<0.05$). They suggest that both techniques are of similar value in an emergency setting.

7.Raghu S. Thota, Ajay Aravind et al conducted imaging techniques for identifying the sciatic nerve. Using an anterior approach to the sciatic nerve ,sciatic nerve blockade was done, who presented with calcaneal fractures requiring open reduction and internal fixation. The presence of severe back spasms precluded positioning for a posterior approach to the sciatic nerve. Using a C-arm fluoroscopy unit the lesser trochanter of the femur was identified using a 15-cm 22-guage spinal needle. A small amount of nonionic contrast medium (Omnipaque) confirmed needle placement before injecting 20 mL of 0.25% bupivicaine . This anterior approach to the sciatic nerve when combined with fluoroscopy and contrast media injection is an acceptable anaesthetic technique for repair of calcaneal fractures when general anesthesia is to be avoided.

8.Marty L. Ericksen Jeffrey D. showed anatomic relationship of the sciatic nerve to the lesser trochanter, which was analyzed by magnetic resonance scans performed on 20 patients in the supine position. Images from five axial levels were studied, specifically, at the level of the lesser trochanter and at 1-cm intervals inferior to the lesser trochanter for 4 cm. At the level of the lesser trochanter, the sciatic nerve was lateral to the femoral border (inaccessible) in 13 of 20 patients with a mean

distance of -4.0 ± 7.7 mm. At 4 cm below the lesser trochanter, the sciatic nerve was medial to the femoral border (accessible) in 19 of 20 patients with a mean distance 7.8 ± 5.8 mm. The distance from the anterior border of the femur to the sciatic nerve was 42.9 ± 5.8 mm at the level of the lesser trochanter and 45.7 ± 9.5 mm at 4 cm below the lesser trochanter. The classic description of the anterior approach to the sciatic nerve suggests that the needle be walked off medially at the level of the lesser trochanter. In contrast, at 4 cm below the lesser trichinae, the sciatic nerve was medial to the femur in 19 of 20 subjects and conclude that needle insertion medial to the proximal femur, 4 cm below the lesser trochanter, is a more direct anatomical approach to the anterior sciatic nerve block.

MATERIALS AND METHODS

Study design:

This is a cohort study. This study was conducted at government Rajaji Hospital attached to Madurai medical college, Madurai.

40 patients of ASA I – IV physical status who got admitted in ward for below knee surgical procedures were taken into consideration.

PROCEDURE

After ethical committee approval, and after preoperative evaluation and discussion of anesthetic options informed consent was obtained from the patients. Intravenous access was obtained. Anaesthesia machine checked resuscitative equipments and drugs were kept ready.

Inclusion criteria:

Age >14 yrs

Both sexes

ASA I-IV undergoing surgery for both elective/emergency below knee

Exclusion criteria

Age < 14 yrs

Pregnancy

Infection at the puncture site

Allergy to amide local anaesthetics

Standard monitoring-BP/pulse/SpO2

Sterile towels and 4*4 gauge packs

20ml syringe with local anaesthetics

Sterile gloves, marking pens, and surface electrodes

One 25G needle for skin infiltration

A 15cm long bevel, insulated nerve stimulating needle

Peripheral nerve stimulator

Procedure:

Drugs: 20 ml of 2% Lidocaine with 5 microgram of adrenaline/ml

20 ml of 5% bupivacaine used for the study. Equipments are kept ready. After establishing an Intravenous line, patient was positioned supine as necessary for combined sciatic and femoral block.

Anatomical Land marks:

With the patient in supine position

a) 1st a line drawn connecting the anterior superior iliac spine and pubic tubercle

b) 2nd line drawn parallel to the 1st line passing along the greater trichinae.

c) The 1st line is divided into three equal parts. From the junction of lateral 2/3rd and medial 1/3rd a perpendicular line drawn. The point of intersection with the 2nd line is the site of needle entry.

Under strict aseptic precautions local anesthetics solution was prepared and all the equipments, needed like nerve stimulator, insulated needle, syringe were kept ready.

First the femoral nerve was blocked using the nerve stimulator .the needle was advanced carefully from point C, 45° cephalad and 10° medially, to a point until movement of the patella related to the femoral nerve stimulation (5–6 cm depth) was observed. The needle was never advanced more than 8 cm during this phase. Nerve stimulator output was decreased to 0.4 mA to optimize needle placement .initially 3mA current was used first to identify the nerve and then gradually reduced to 0.4mA till the response is present by moving the needle anterior to posterior, then lateral to medial. The patella dance was considered as the evoked motor response or end point of nerve location. When the response is present at 0.4mA 15ml of the mixture of local anaesthetic solution injected after negative aspiration. Immediately the disappearance of the

patella dance was noted and gradually strength of the current increased. If no response seen it indicators the exact location of the nerve.

The sciatic nerve block was performed after the blockade of the femoral nerve with the same point of needle entry, the needle was withdrawn to the subcutaneous tissue and redirected 10° laterally and 80° caudad.

Initially 3mA Strength was used to first identify the nerve. Within a depth of 9.5–13 cm, the sciatic nerve was identified with the evoked motor response related to the sciatic nerve –plantar flexion or foot inversion is noted. Stimulation of its common peroneal nerve component (dorsiflexion or eversion of the foot) or its tibial nerve component (plantar flexion and inversion of the foot and flexion of the toes). And gradually reduced to 0.4mA till the foot eversion (or) plantar flexion movement noticed by moving the needle anterior to posterior and then lateral to medial. When the plantar movement is present with 0.4mA 25ml of the prepared local anaesthetic solution was injected after careful aspiration. The intensity of the sensory and motor block was assessed every 5 min up to 20 min after being performed and every hour after surgery until sensory function recovered in either the common peroneal or tibial territory to determine the recovery time. Preoperatively and

postoperatively, a three-level scale was used to evaluate the intensity of the sensory and motor block (no block, partial and complete block). The sensory block was assessed by application of ice to the dorsal aspect of the foot (common peroneal nerve) and to the plantar aspect of the foot (tibial nerve). The sensory block was considered complete if the patient did not feel the cold. Patients were asked to perform a dorsi and plantar flexion to assess the intensity of the motor block (normal motor function, partial block, and complete block). The motor block was considered complete when a motor block was observed in both the common peroneal and the tibial territories. The duration of the sensory and motor block was defined as the time between the performance of the block and the recovery of sensory and any motor function, respectively.

After confirming the block that has taken up well surgery was allowed to proceed. The VAS score was assessed every 1 hr after performance of the block. When the VAS score reaches 5, it was taken as the duration of pain relief, following which oral analgesic (or) parental analgesic was allowed to start.

Complications such as vascular injury, toxicity of the drug and infection were taken into consideration.

PARAMETERS OBSERVED

1. **Mean time to perform block-** (from the time of skin disinfection to the end of injection.

2. **Successful block-** defined as analgesia in the dermatomal supply of sciatic and femoral nerve

3. Onset of Analgesia-Onset of analgesia was taken as abolition of touch sensation over the distribution of sciatic and femoral nerve and was assessed every minute after the performance of the block.

4. Onset of motor blockade:

Onset of motor blockade was assessed every 2 minute after the block using three point scale

5. Duration of analgesia

The pain was assessed using visual Analogue scale having 10cm length numbered from 0 to 10. Patient was explained about the visual Analogue scale as 0 - No pain and 10 the worst possible pain and was asked the score in visual analogue scale.

The patient was observed every 30 minutes after the surgery is over till the motor block reverses and thereafter hourly for 6 hrs .The first VAS score to appear

Time of which VAS score is greater than 5 is noted and patient was given intramuscular NSAID.

Duration of post operative analgesia (the period of time after the surgery till the patient needs analgesic -VAS score more than 5)

6. Vital parameters

Pulse rate

Blood pressure

Respiratory rate monitored periodically

oxygen saturation

7. Complications:

Accidental vessel puncture.

OBSERVATION AND RESULTS

Table 1: Age distribution

Age group	Cases	
	No.	**%**
Up to 20 years	2	5
21-30 years	2	5
31-40 years	5	12.3
41-50 years	10	25
51-60 years	11	27.5
61-70 years	6	15
Above 70 years	4	10
Total	40	100
Range	18-75 years	
Mean	51	
S.D.	14.8	

The study was done with the patients aged ranging from 18 years as the minimum and 75 years as the maximum age old. The mean age of distribution is around 51 years.

Range 18-75 years. Mean 51 years

Standard deviation-14.3years

Sex Distribution:

Out of 40 cases 36 were male and 4 cases were female.

Male - 90%

Female - 10%

Sex	Cases	
	No.	%
Male	36	90
Female	4	10

ASA Class Distribution:

Out of 40 cases ASA I include 11 cases; ASA II includes 24 cases; ASA III includes 5 cases.

ASA I - 27.5%

ASA II - 60%

ASA III - 12.5%

ASA	Cases	
	No.	%
I	11	27.5
II	24	60
III	5	12.5

Procedure:

BK amputation	26 cases	65%
wound debridement	10 cases	25%
SSG	2 cases	5%
Flap cover	1 case	2.5%
Through ankle disarticulation	1 case	2.5%

PROCEDURE	Frequency	Percent
BK Amputation	26	65.0
Flap cover	1	2.5
SSG	2	5.0
Through Ankle disarticulation	1	2.5
Wound debridement	10	25.0
Total	40	100.0

Femoral Nerve Block:

The average onset time of sensory block to temperature is 3.79 minutes and the range varied from 3minute-6minute.

The average onset time of sensory block to pin prick is 6.42minute. The range varied from 5-8 minute.

Out of the 40 cases 38 cases the sensory blockade was taken well. In 2 cases the femoral nerve block was spared.

Sensory Block Onset time (in minutes)	**Temp.**		**Pin prick**	
	No.	**%**	**No.**	**%**
3	16	42.1	-	-
4	15	39.5	-	-
5	6	15.8	9	23.7
6	1	2.6	9	23.7
7	-	-	15	39.5
8	-	-	5	13.2
Total	38	100	30	100
Range	3-6 minutes		5-8 minutes	
Mean	3.79 minutes		6.42 minutes	
S.D.	0.81 minutes		1 minute	

Sciatic Nerve Block:

The average onset time for sensory block to temperature is 6.62minute. The range varied from 5-9 minute. The average onset time for sensory block to principle is 10.24minute. The range varied from 7-13 minute.

Out of the 40 cases, 37 cases the sensory blockade was well taken up. In 3 cases it was spared.

The average percentage for motor block to sciatic nerve was 48%. It include

Complete motor blockade	- 67.5%
Partial motor blockade	- 17.5%
No motor blockade	- 15%

Out of the 40 blocks that were performed, 35 cases had taken up well, 2 blocks had failed because of failed femoral blockade and 3 were due to failed sciatic nerve blockade.

Onset time – Sciatic (in minutes)	Temp.		Pin prick	
	No.	%	No.	%
5	6	16.2	-	-
6	13	35.1	-	-
7	11	29.7	1	2.7
8	3	8.1	4	10.8
9	4	10.8	10	27
10	-	-	8	21.6
11	-	-	5	13.5
12	-	-	2	5.4
13	-	-	7	18.9
Total	37	100	37	100
Range	5-9 minutes		7-13 minutes	
Mean	6.62 minutes		10.24 minutes	
S.D.	1.19 minutes		1.74 minutes	

Motor Block

Motor Block Score	Cases	
	No.	%
0	27	67.5
1	7	17.5
2	6	15
Total	40	100
Range	0-2	
Mean	0.48	
S.D.	0.75	

Block was considered failed, if no pain relief to pinprick even after 30 min after the performance of the block.

The success rate of the femoral block was – 95% (38 cases)

The success rate of the sciatic block was – 92.5% (37 cases).

Nerves spared

Nerves spared	Cases	
	No.	%
Femoral	2	5
Sciatic	3	7.5

Time for procedure:

Time for procedure (in minutes)	Temp.	
	No.	%
Up to 15	10	25
16-20	18	45
21-25	12	30
Above 25	-	-
Total	40	100
Range	3-25 minutes	
Mean	18.23 minutes	
S.D.	3.19 minutes	

The average time that is required for the performance of the block was around – 18.23 minutes. The time varied from 3minute – 25 minute.

Post operative analgesia:

The average time that post operative pain relief after the surgery was around 263.5minute. The time ranged from 210-330 minutes.

Post Operative Analgesia

Post Operative Analgesia (in minutes)	**Cases**	
	No.	**%**
0-180	-	-
181-210	3	7.5
211-240	12	30
241-270	17	42.5
271-300	6	15
300-330	2	5
Total	40	100
Range	210-330 minutes	
Mean	263.5 minutes	
S.D.	28.3 minutes	

DISCUSSION

In my study a regional technique- sciatic and femoral nerve were blocked through anterior approach using peripheral nerve stimulator for below knee surgeries. It is safe, not threatening or unpleasant to the patient, allows adequate surgical access to the operative site, and causes as little disturbance as possible to the internal homeostatic mechanisms. The sciatic nerve can be approached with the patient either supine or in the Sims position. In my study sciatic and femoral nerve block was performed with patient in supine position and also it is performed via single point of entry.

The land marks were drawn on an average of 1.8 minutes. The average time to perform the block was 18.23 + 3.19 minutes. The success of femoral nerve block was 95% and sciatic was 92.5%. Jerry D. Vloka et al studied the success rate of locating the sciatic nerve was improved by inward rotating the leg[5] and locate the nerve in 80% of the individual in first attempt there by improving the success rate. Redirecting the needle 10-15 medially along the lesser troachanter increased to locate the sciatic nerve[4].

The success rate of combined sciatic and femoral block in my study was 92.5% and 95%. This is similar to that of the study conducted

by Pierre Pandin et al in 119 patients[1]. In his study femoral nerve was blocked in 90% and sciatic nerve was blocked in 95%

Fuzier R, et al conducted a comparative study in 60 patients in emergency lower limb surgeries. He concluded that the success rate of both the anterior (80%) and lateral approach (85%) of the sciatic nerve blockade the same[6].

This is similar to that of the success rate 92.5% in my study.

In this study the duration of postoperative analgesia lasted for 263.5 minutes which is similar to that of the duration produced by mepivacaine which is around 270 hours.

This is the only alternative technique to neuraxial blockade in which this technique absolute or relative contraindications.

The technique has substantial advantages, such as easy landmark, low risk of vascular injury and impossibility of complications such as total spinal or epidural Anesthesia. This technique allows the patient to be placed in supine position which over comes the disadvantage of shifting and positioning in trauma patients. This technique can be used in patients on oral anti coagulants and with reduced cardio pulmonary reserve.

SUMMARY

40 patients admitted in ward planed for below the surgeries were given combined sciatic and fermoral nerve block through anterior approach via single point of entry. Nerve stimulator was used for the block using evoked motor response as the end point for performance of the block. This block produces a success rate of 90%. It produced adequate level of surgical anaesthesia, better hemodynamic stability. It also provides substantial post operative pain relief for these patients.

CONCLUSION

This easy and reliable anterior technique for performing sciatic and femoral nerve blocks is an alternative to subarachnoid block for below knee surgeries although it is not a substitution and it is suitable especially in patients with limited mobility and in patients with reduced cardio pulmonary reserve.

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EVALVATION OF COMBINED SCIATIC AND FEMORAL NERVE BLOCK THROUGH ANTERIOR APPROACH FOR BELOW KNEE SURGERY.

NAME :

AGE :

SEX :

ASA :

IP.NO :

DIAGNOSIS :

PROCEDURE :

DRUG USED

TIME DURATION FOR PERFORMING BLOCK:

DRUG INJECTED TIME:

ONSET OF SENSORY BLOCK

SNO	PIN PRICK	TEMP
SCIATIC		
FEMORAL		

MOTOR BLOCK

EXTENSION OF GREAT TOE

0	1	2

EXTENSION OF ANKLE

SCALE 0 COMPLETE MOTOR BLOCK

1 REDUCED MOTOR STRENGTH BUT ABLE TO MOVE TOES

2 NORMAL MOTOR FUNCTION

HAEMODYNAMICS:

S NO	15 mins	30 mins	45 mins	1 hr	1 hr 30 mins
HR					
B.P					
PR					
RR					

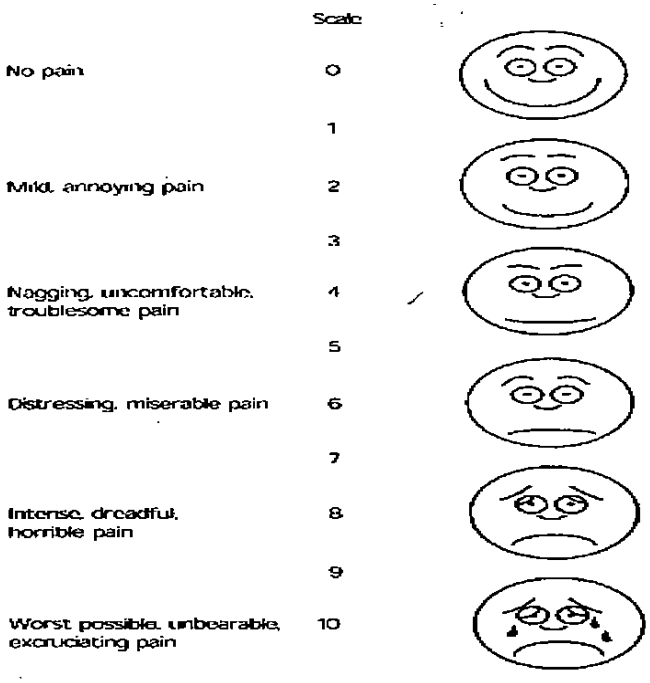
POST OPERATIVE PAIN

1 hr	2 hr	3 hr	4 hr

VAS SCORE

1 st dose of analgesic required

SIDE EFECTS



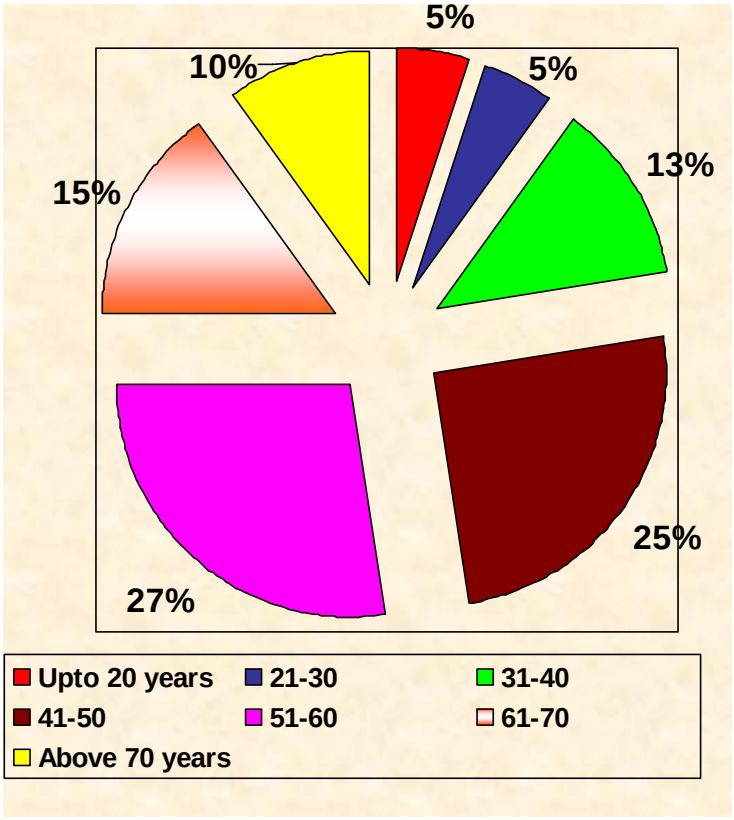
MASTER CHART

S.No	NAME	AGE	SEX	IP NO	ASA	DIAGNOSIS	PROCEDURE	S.B.F.TEMP	S.B.F.PINPRICK	SCI.TEMP	S.PINPRICK	MOTOR BLOCK	TIME PROCE.	NER.SPARED	POST OP. ANA	COMPLICATION
1	Ayyanar	58	M	23932	II	Cellulitis leg	BK Amputation	4	8	7	13	0	22		255	2
2	Sonai	46	M	25375	I	ulcer foot	Wound debridement	3	5	6	9	0	15		270	2
3	Ponnuthai	48	F	41124	II	Ch.ulcer Leg	BK Amputation	4	7	7	10	0	21		240	2
4	Vellusamy	60	M	46473	II	D.M. Foot	Through Ankle disarticulation	3	5	6	9	0	16		270	2
5	Mariappan	72	M	48483	II	Crush injury foot	BK Amputation	4	7	6	9	1	15		300	2
6	Cellaiya	70	M	24538	III	Disease leg	BK Amputation	4	8	6	12	0	17		330	2
7	Ajmalkhan	51	M	24452	III	Cellulitis leg	Wound debridement	5	8	9	13	0	19		240	2
8	Ramesh kumar	18	M	23023	I	Crush injury foot	BK Amputation	3	6	6	9	0	13		315	2
9	Karuppiah	60	M	31568	II	gangrene foot	BK Amputation	5	8	5	7	2	18		240	2
10	Bharathi	50	M	16973	II	D.M. Foot	BK Amputation	5	7	7	11	0	23		300	2
11	Karuppiah Thevar	60	M	54177	II	Cellulitis leg	BK Amputation	6	8	9	13	0	21		240	2
12	Kasthuri	60	F	47242	II	D.M. Foot	BK Amputation	5	7	9	13	0	20		300	2
13	Ramesh	47	M	43766	II	D.M. Foot	BK Amputation	3	6	8	13	2	17		240	2
14	Annamalai	65	M	2942	II	gangrene foot	BK Amputation			8	11	0	22	Femoral	225	2
15	Murugan	50	M	16313	I	ulcer foot	Flap cover	4	6	6	10	0	18		270	2
16	Murugasen	56	M	16843	I	Ch. Ulcer heal	Wound debridement	4	7	6	9	0	17		240	2

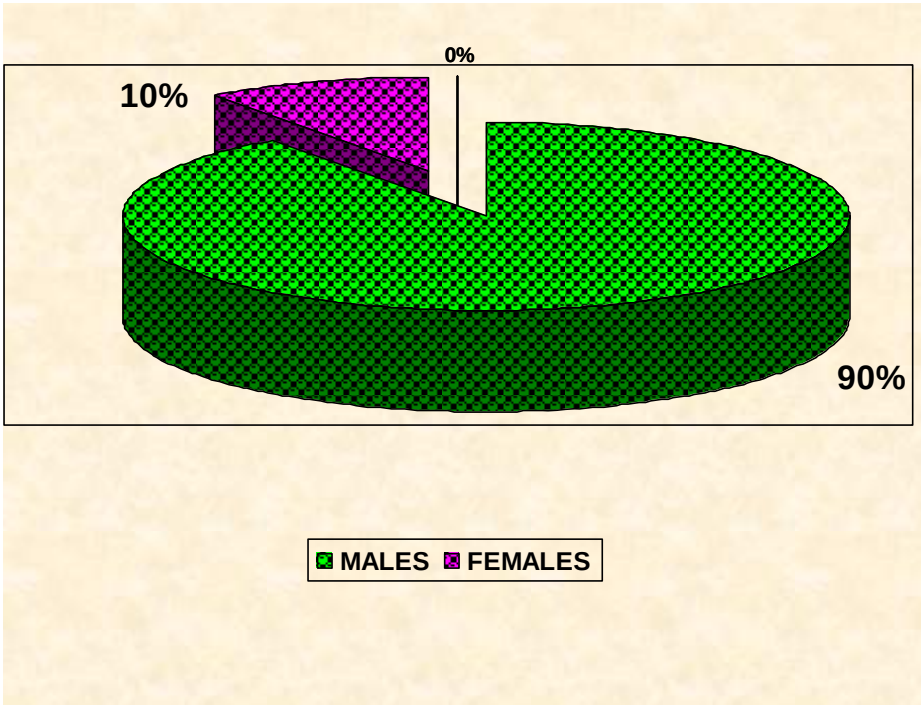
S.No	NAME	AGE	SEX	IP NO	ASA	DIAGNOSIS	PROCEDURE	S.B.F.TEMP	S.B.F.PINPRICK	SCI.TEMP	S.PINPRICK	MOTOR BLOCK	TIME PROCE.	NER.SPARED	POST OP. ANA	COMPLICATION
17	Madurai Veeran	52	M	21123	II	D.M ulcer foot	Wound debridement	3	6	5	8	0	16		240	2
18	Anbu	42	M	90344	II	#BB Leg Septicemia	BK Amputation	3	6	7	12	1	22		270	2
19	Asha	40	F	49836	II	D.M. Foot	BK Amputation	4	7	9	13	2	19		270	2
20	Idumban	64	M	10031	II	Cellulitis leg	BK Amputation	4	6	7	10	0	15		270	2
21	Anbarasan	20	M	98010	I	#BB Leg	Wound debridement	4	7	5	9	0	17		270	2
22	Murugan	33	M	6624	II	TAO non h.ulcer	BK Amputation	4	6	7	10	0	17		210	2
23	Gopal	44	M	1677	II	Cellulitis leg	BK Amputation	4	7	7	11	0	25		270	2
24	Pandi	34	M	97586	I	Non H.Ulcer leg	Wound debridement	4	7	7	11	1	15		255	2
25	Chinnaiyan	62	M	97561	II	Gangrene Leg	BK Amputation	4	7	8	13	0	20		285	2
26	Kalimuthu	40	M	16669	II	TAO non h.ulcer	BK Amputation	4	7	7	11	1	20		270	2
27	Kaliappan	34	M	10049	I	Crush injury foot	Wound debridement	4	7	6	10	0	21		255	2
28	Chandran	44	M	11316	II	Gangrene Leg	BK Amputation	5	7			2	23	Sciatic		2
29	Velusamy	66	M	88396	II	Gangrene Leg	BK Amputation	3	5	6	9	0	15		270	2
30	Pandi	62	M	22098	I	Ch.ulcer Leg	Wound debridement			7	10	0	22	Femoral	300	2
31	Velu	60	M	23395	II	D.M. Foot	BK Amputation	3	5	5	8	0	18		300	2
32	Durairajan	55	M	51422	II	D.M. Foot	BK Amputation	5	7			2	20	Sciatic		2
33	Ganesan	75	M	29003	III	Aorto occulisive disease leg	BK Amputation	3	7	6	9	1	22		240	2
34	Bala Murugan	24	F	20619	I	Varicoarse Ulcer	SSG	3	5	6	10	1	14		210	2

S.No	NAME	AGE	SEX	IP NO	ASA	DIAGNOSIS	PROCEDURE	S.B.F.TEMP	S.B.F.PINPRICK	SCI.TEMP	S.PINPRICK	MOTOR BLOCK	TIME PROCE.	NER.SPARED	POST OP. ANA	COMPLICATION
35	Dhanalakshmi	71	M	20575	III	TAO Leg gangrerne	BK Amputation	3	5	5	8	0	13		270	2
36	Anandha kumar	26	M	22316	II	Crush injury foot	Wound debridement	3	5	7	9	0	16		270	2
37	Thangavel	45	M	37344	II	Gangrene Leg	BK Amputation	3	5			2	21	Sciatic		2
38	Gnanakan	75	M	24462	III	TAO Leg gangrerne	BK Amputation	3	5	6	10	1	16		210	2
39	Kalimuthu	45	M	37544	I	in jury Foot	Wound debridement	3	6	5	8	0	13		270	2
40	Palsamy	56	M	21532	I	Raw area Foot	SSG	3	6	6	9	0	15		270	2

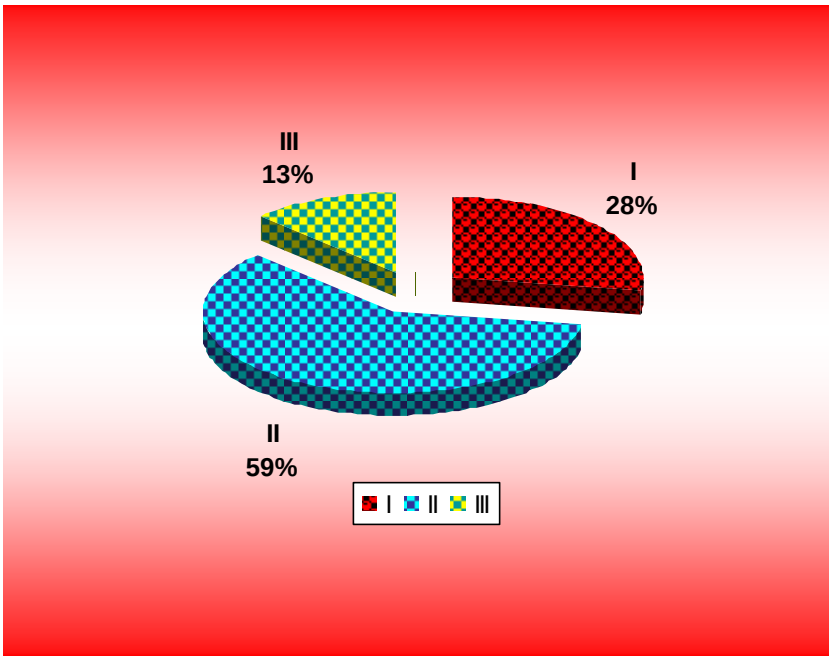
AGE DISTRIBUTION



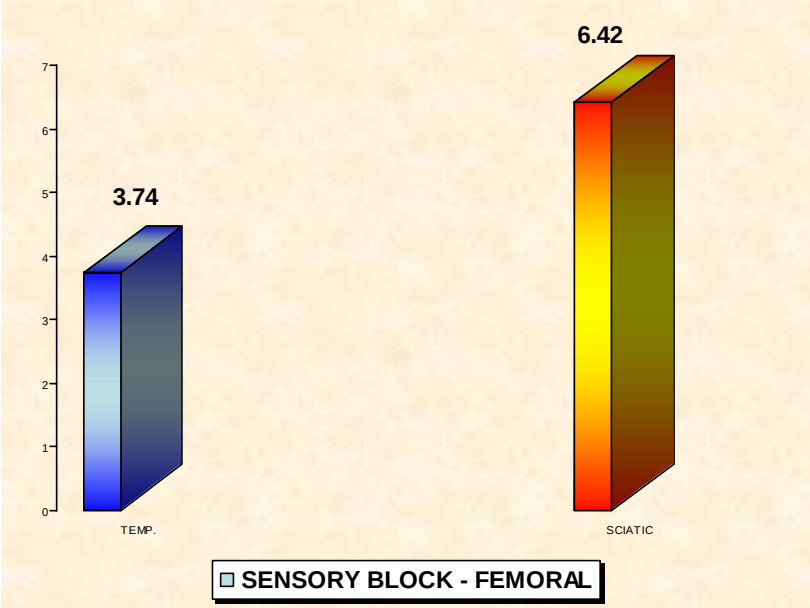
SEX DISTRIBUTION



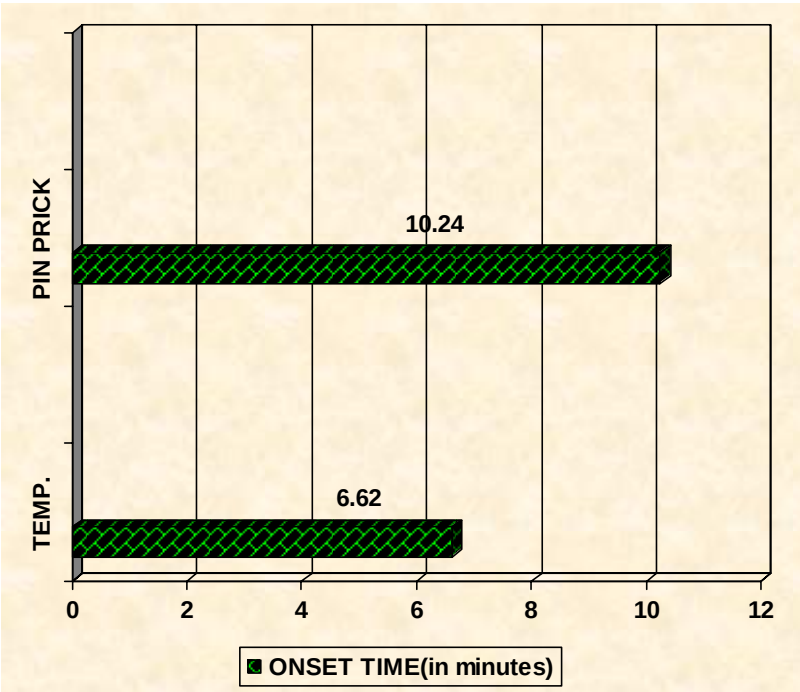
ASA



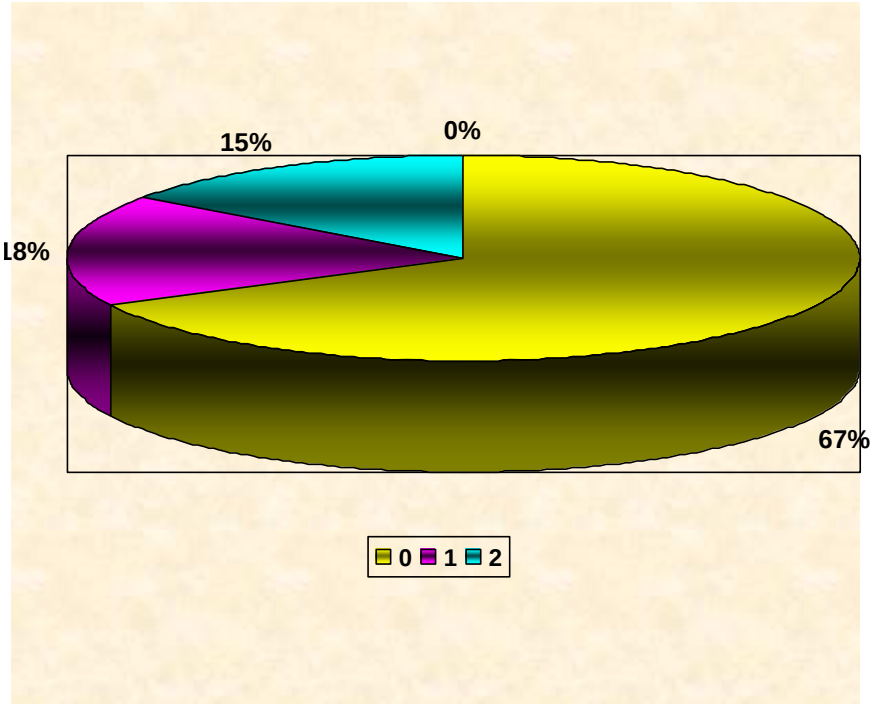
SENSORY BLOCK - FEMORAL



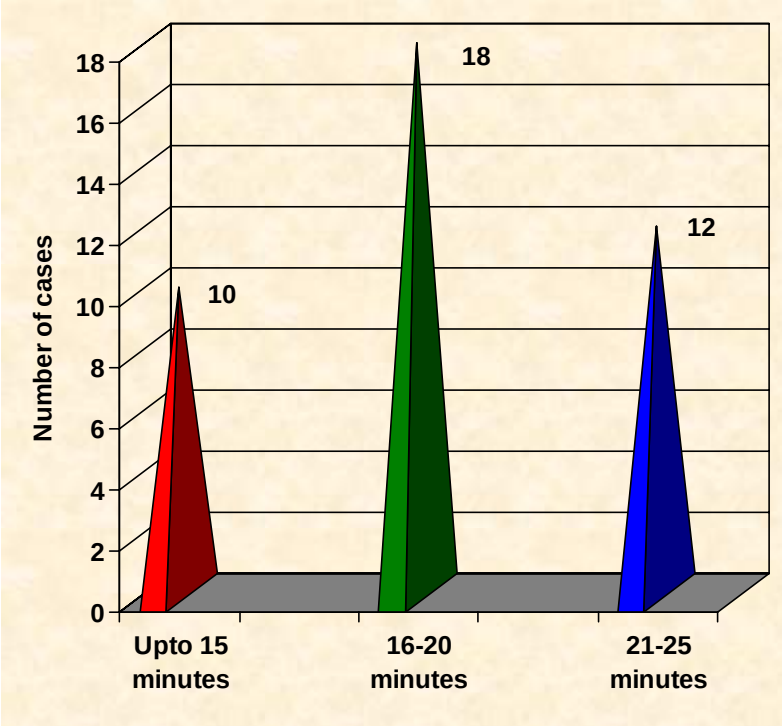
ONSET TIME - SCIATIC



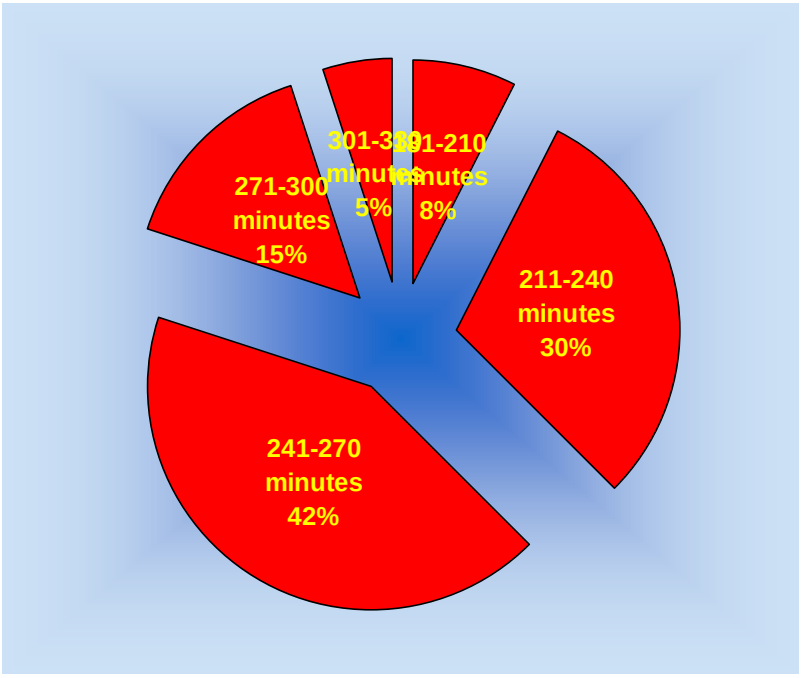
MOTOR BLOCK

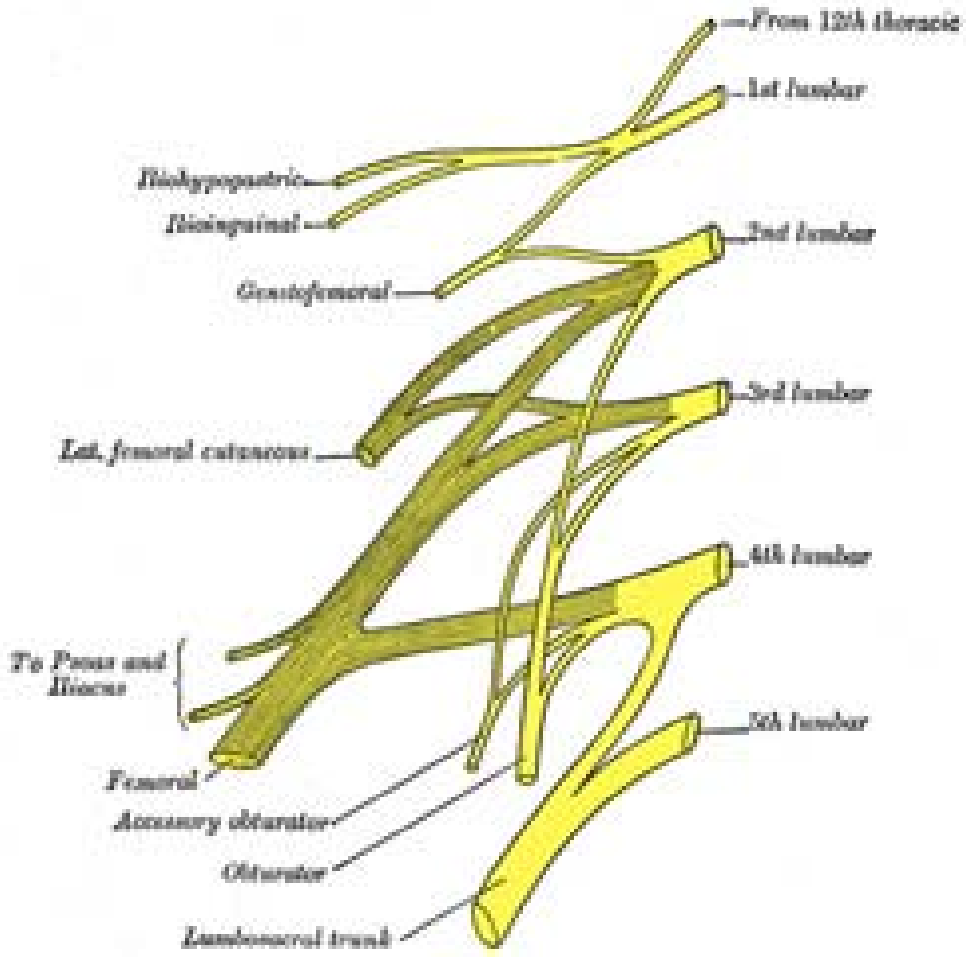


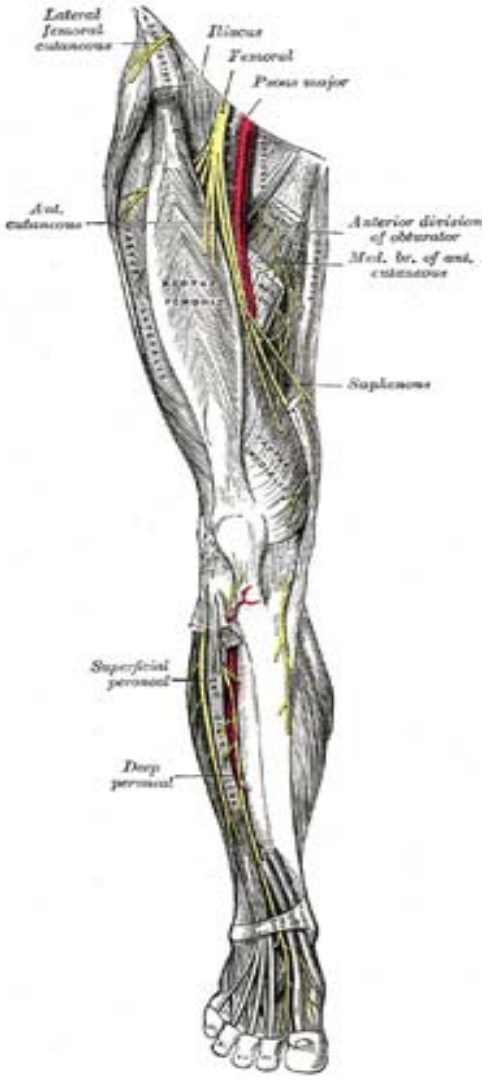
TIME FOR PROCEDURE

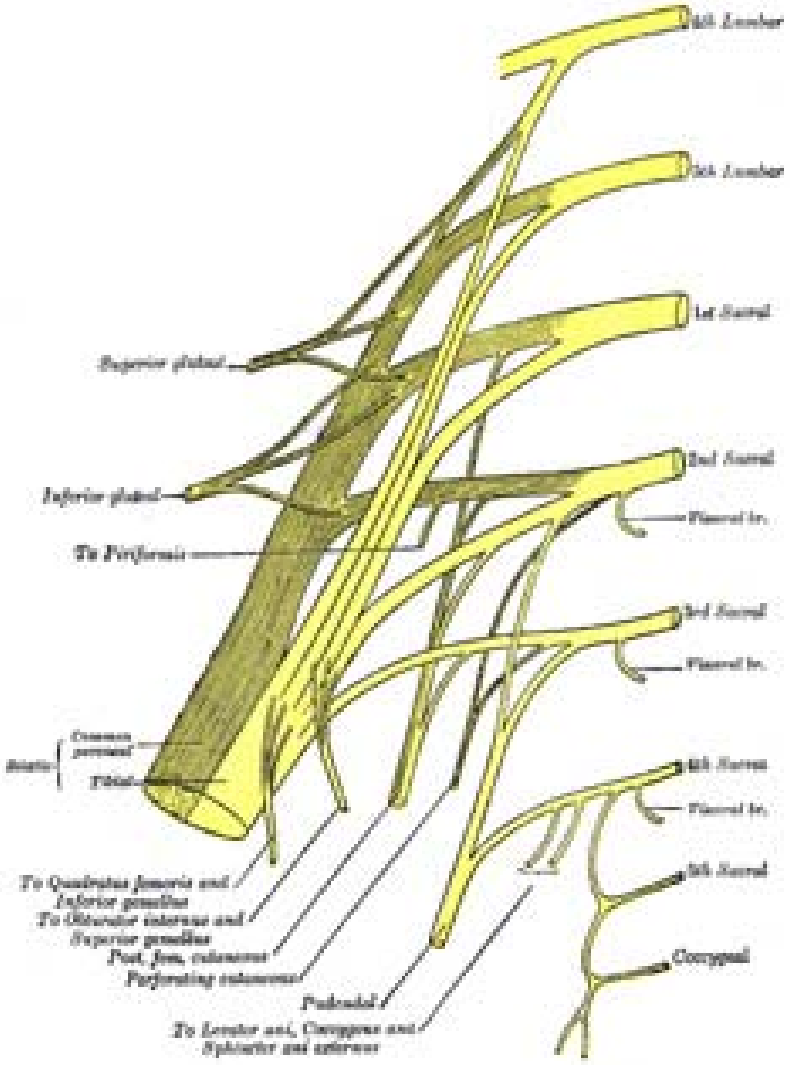


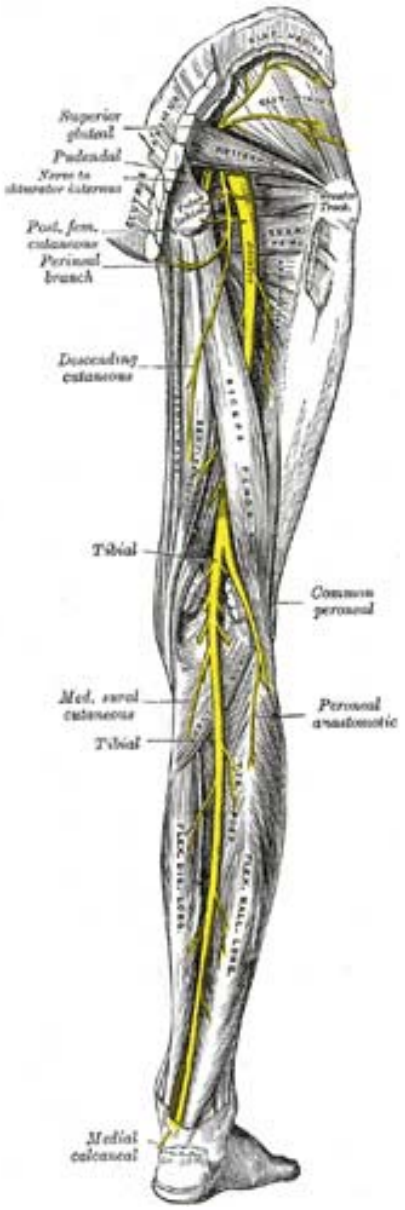
POST OPERATIVE ANALGESIA




From 12th thoracic
1st lumbar
Iliohypogastric
Ilioinguinal
2nd lumbar
Genitofemoral
3rd lumbar
Lat. femoral cutaneous
4th lumbar
To Psoas and Iliacus
5th lumbar
Femoral
Accessory obturator
Obturator
Lumbosacral trunk


Lateral femoral cutaneous
Iliacus
Femoral
Psoas major
Ant. cutaneous
Anterior division of obturator
Med. br. of ant. cutaneous
Saphenous
Superficial peroneal
Deep peroneal


4th Lumbar
5th Lumbar
1st Sacral
Superior gluteal
2nd Sacral
Inferior gluteal
Pudendal
To Pyriformis
3rd Sacral
Sciatic
Common peroneal
Tibial
4th Sacral
5th Sacral
To Quadratus femoris and Inferior gemellus
To Obturator internus and Superior gemellus
Post. fem. cutaneous
Perforating cutaneous
Pudendal
To Levator ani, Coccygeus and Sphincter ani externus
Coccygeal


Superior gluteal
Pudendal
Nerve to obturator internus
Post. fem. cutaneous
Perineal branch
Descending cutaneous
Tibial
Common peroneal
Med. sural cutaneous
Tibial
Peroneal anastomotic
Medial calcaneal